

## *Influenza Study Program in the United States*

By DORLAND J. DAVIS, M.D., Ph.D.

AMONG the major public health problems in infectious diseases, influenza remains one of the most challenging and most important to medical scientists all over the world. Its importance is due not only to the occurrence at long intervals of severe pandemics, but also to the disruption of normal activities by illness and lost time during the less severe outbreaks occurring nearly every year. Much of our knowledge and interest has been stimulated by the experiences in 1918, when approximately 15 million people throughout the world died of influenza, and by the possibility of another such occurrence. But the heavy toll in disability and economic loss every few years, when it occurs in milder form, also makes influenza of major concern to health authorities. This disease has always been of importance to military services, and its control forms a large part of their preventive medical programs.

Characteristic of influenza are the explosive outbreaks in which the incidence sometimes involves 25 to 30 percent of a local population over a period of 2 or 3 weeks. Epidemics recur at 2- to 4-year intervals, usually but not always during the winter months. The death rate is ordinarily highest in the aged. Influenza appears in rapid sequence in neighboring communities, though sometimes intervening communi-

ties are spared; and it tends to involve large regions, even continental and world-wide. These are the general features which distinguish influenza sharply from other infectious diseases, and, prior to the identification of the etiological agents, characterized it perhaps more accurately than the clinical picture.

With the first isolation of the specific virus from human cases of clinical influenza in 1933 by Smith, Andrewes, and Laidlaw, new techniques were soon developed for the study of this disease. At present we have a number of laboratory methods for the specific diagnosis of influenza— isolation of the virus by inoculating pharyngeal washings into embryonated eggs or ferrets, complement fixation reactions, and the hemagglutination inhibition test. These methods have undergone several years of trial and now have reached the stage of development and simplicity at which they can be used with confidence by a number of laboratories, and the results can be fairly compared. They have been used extensively on a local scale and particularly in selected groups such as military or institutional populations.

### **Origin of Program**

Since influenza is a world-wide disease, it is necessary to obtain rapidly information of its occurrence from all parts of the world. With the laboratory aids now available, much useful information can be obtained by an international system of reporting based upon specific etiological diagnosis. Such a plan was proposed at the Fourth International Congress for Microbiology in Copenhagen in July 1947. Under the

---

*Dr. Davis is executive secretary of the influenza information center of the WHO Influenza Study Program in the United States and chief of the influenza unit in the National Microbiological Institute, Public Health Service.*

---

sponsorship of the World Health Organization, a World Influenza Center was set up at the National Institute for Medical Research, London, to study and analyze newly isolated strains. Subsequently, at the suggestion of the WHO, the Surgeon General of the United States Public Health Service invited the participation of American investigators in the program. The Commission on Influenza of the Armed Forces Epidemiological Board had been maintaining a continuous interest in this problem and had established listening posts and a strain study center some years before. On the advice of the virus and rickettsial study section of the National Institutes of Health, the Surgeon General sponsored a meeting of representatives of the Surgeons General of the Army, Navy, Air Force, and Public Health Service. At the meeting it was decided to build the program in the United States largely around the strain study center and use the existing facilities for investigating influenza.

In 1948 the influenza study program in the United States was activated to obtain and exchange reliable information concerning the occurrence of outbreaks of influenza in the United States and throughout the world, to isolate specific viruses involved, and to study and compare these with respect to their antigenic characteristics. In addition, it was hoped that this information would be useful in determining the effectiveness of current vaccines and in the selection of strains to be used in the vaccines.

#### **Organizational Set-up**

The program operates under an advisory committee composed of representatives of the Surgeons General of the Public Health Service, Navy, Army, and Air Force, and the Armed Forces Medical Policy Council of the Department of Defense, and the Bureau of Animal Industry, United States Department of Agriculture, who are responsible for over-all policy.

The actual functions of the program are carried on more or less autonomously by seven regional laboratories in various parts of the United States and one in Puerto Rico. These laboratories, which integrate the program in their respective areas, enlist the assistance of

other laboratories of the area. They distribute specific influenza antigens and antisera to their area collaborators, and they identify as influenza virus those agents they or the collaborating laboratories have isolated before the isolates are transmitted to the strain study center.

Collaborating area laboratories, selected for each area by the corresponding regional laboratory, serve as lookout posts to report outbreaks of influenza; perform serologic tests with the serum of suspected cases; and, in some cases, isolate virus from patients with influenza. All of these laboratories have been selected on the basis of their interest and particular competence in diagnosis of influenza, and they represent university, hospital, Federal, State, and municipal laboratories.

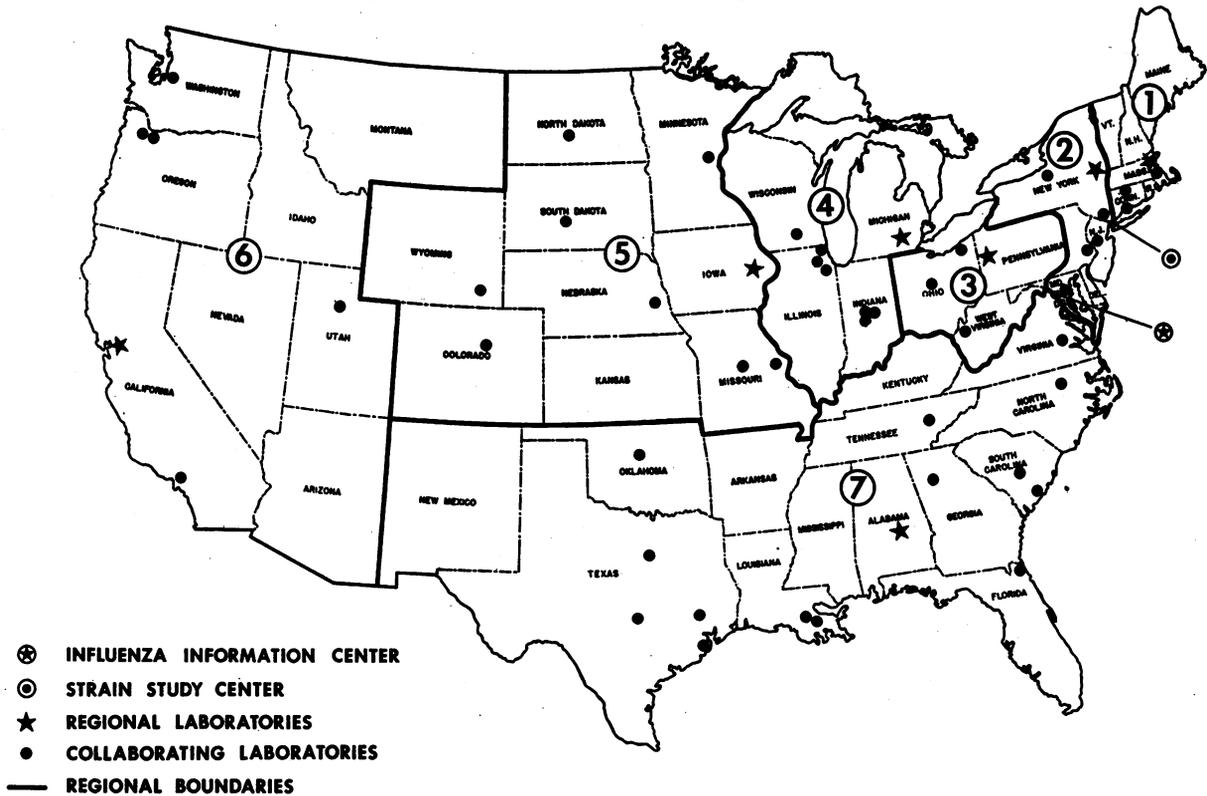
Information is obtained from the six Army medical laboratories in the United States, other Army medical laboratories in Europe and Japan, the Department of Virus and Rickettsial Diseases of the Army Medical Service Graduate School at the Army Medical Center, Naval medical laboratories at Great Lakes, Ill., and elsewhere, and Public Health Service laboratories at the National Institutes of Health and Communicable Disease Center. The influenza strain study center is located at New York State University Medical Center, Brooklyn, N. Y. Strains of influenza virus newly isolated from patients by regional or other laboratories participating in the program are sent to the strain study center for antigenic analysis.

The influenza information center, located at the National Institutes of Health, Bethesda, Md., is responsible, under the advisory committee, for receiving and disseminating information on outbreaks of influenza and the strains of virus causing these outbreaks; for establishing a coordinated series of strategically distributed regional and area diagnostic or research laboratories for the isolation of new strains of influenza virus; and for aiding in arranging conferences concerned with problems of the program.

#### **World-Wide Circulation**

Current reports from the participating laboratories are coordinated with those from State

## World Health Organization Influenza Study Program in the United States



Numbers indicate study areas

NOTE.—The strain study center is at the State University of New York, Brooklyn, and the influenza information center is at the National Institutes of

Health, Bethesda, Md. A regional laboratory is located in Puerto Rico, and Alaska and Hawaii each have a collaborating laboratory.

epidemiologists and published weekly in the *Communicable Disease Summary* and the *Morbidity and Mortality Weekly Report* of the National Office of Vital Statistics, Public Health Service. These reports are sent to health authorities in the United States and other countries, the World Health Organization, the World Influenza Center in London, and others interested. In unusual circumstances foreign laboratories and centers are informed by cable.

In Canada a similar organization with the same objectives has been in operation and provisions made for exchange of information and study of new strains of virus.

With the development of virus laboratories in the countries of Central and South America, new opportunities are being offered for the collection of additional information of great

importance to our knowledge of the spread of influenza. Plans are being developed by the Regional Office for the Western Hemisphere of the World Health Organization (Pan-American Sanitary Bureau) to initiate an expansion of the program to include all countries of the Western Hemisphere in a coordinated program of influenza reporting and study of newly isolated strains. Such an extension of the present programs in the United States and Canada should greatly enhance the value of the worldwide effort to solve some of the problems in the epidemiology of the disease.

### Influenza Occurrence Last Winter

The first indications of influenza during the winter season of 1951-52 were received from Utah, where there was a sharp outbreak of influenzalike disease in the cities of Ogden and

Provo during the latter part of December 1951. Influenza B virus was recovered from the throat washings of two of the cases. Early in January 1952 a report of influenza was received from a military installation in California. Serologic tests identified it as type B. In the middle of January, cases of clinical influenza were reported in the western part of Kentucky, but opportunities for laboratory confirmation were lacking.

During the remainder of January reports of outbreaks of clinical influenza were received from Nevada, California, Oregon, Little Rock, Ark., and from the Naval Training Center, Bainbridge, Md. Subsequent laboratory studies resulted in the isolation of influenza virus type B from cases in Little Rock, and both type B and A' from the Naval Training Center. Throat cultures performed on a large number of cases at Bainbridge revealed the presence of beta hemolytic streptococci in a high proportion also. Serologic studies in California in the civilian population and military installations indicated the infection was type B.

Early in February reports were received of outbreaks of influenzalike disease in Nebraska, Ohio, and Frederick, Md. Influenza virus type B was recovered from cases in Frederick. In military installations in New Mexico, Illinois, and New York there was an increased prevalence of respiratory diseases, and subsequent serologic examination showed a number of positive serologic tests for influenza type B from these places. During the remainder of February influenza confirmed by isolations of virus and serologic tests was reported in Norfolk, Va., Washington, D. C., Indianapolis, Philadelphia, Boston, New York State, South Carolina, and Texas. Reports continued to be received from California, where the disease occurred in numerous areas throughout the State.

In early March, influenza, type B, was confirmed by positive serologic tests of influenza reported from Syracuse, N. Y., and New Haven, Conn.; and in the middle of March influenza type B virus was isolated in Iowa during the course of an outbreak. During the remainder of the month, the disease confirmed by virus isolation was reported from Michigan and New York City. The report from the WHO Influenza Center, Canadian Department of Health

and Welfare, indicated that an outbreak of influenza in Edmonton, Alberta, occurred in the latter part of March. During the latter part of May and early June influenza occurred in Puerto Rico and was diagnosed by serologic studies as type B.

#### **Type B Predominant**

It is apparent that influenza type B infection was widely distributed throughout the United States beginning in December and persisting through March and possibly April. The outbreaks appear to be localized, and certain cities and areas seem to have escaped almost entirely. There has been no evidence of a uniform zonal spread of the disease since it appeared simultaneously in widespread areas, often skipping intermediate points between foci. While the disease affected all age groups in the population, school-age children and young adults seemed to be affected most frequently. With the exception of three isolations of A' virus and a few positive serologic tests for A', type B virus was incriminated in all outbreaks throughout the country. Reports from the regional laboratories indicate that these strains of type B virus were more similar to strains isolated since 1945 than to the earlier strains such as the Lee. Influenza C was identified by virus isolation in Illinois and by serologic tests in six cases in Michigan during the past winter.

The strain study center received 20 strains of influenza virus isolated during the past season. They all appeared on preliminary examination to be type B and reasonably closely related to recently isolated B strains. However, they seemed to be less closely related to the Seattle/49 strains than those received in recent years. Strains isolated and examined at the University of Michigan with ferret antisera appeared to be closely related to the Allen (1945) strain but not to the Lee. Likewise, a number of strains isolated in Norfolk, Va., and examined at the National Institutes of Health were similar to the 1210 strain (1950) and the Warner (1948) but not to the Lee. Like observations were made at the Johns Hopkins University and some regional laboratories.

Examination of the National Office of Vital Statistics reports of deaths from influenza and pneumonia in 58 cities in the United States in-

dicates that during the winter season there was no appreciable increase in the mortality rates for these diseases. Only two areas in the country, New England and the East South Central States, showed a slight increase during March. In no area was the increase greater than in 1951.

Reports which are summarized in the two accompanying tables were received from 36 of the 54 participating laboratories. A total of 92 isolations of virus have been reported, 89 of which were type B, and the remaining 3 strains were A'. The majority of these were from cases having onset during the month of Feb-

**Table 1. Isolations of influenza virus reported by participating laboratories of the influenza study program in the United States, 1952**

1952, month	Date of onset known		Date of testing, onset unknown	
	A'	B	B	C
January .....	2	4	0	0
February .....	1	52	1	0
March .....	0	27	2	0
April .....	0	3	0	14
Total .....	3	86	3	14

**Table 2. Positive serologic tests (hemagglutination inhibition or complement fixation) for influenza reported by participating laboratories (civilian and military) of the influenza study program in the United States**

1952, month	Date of onset known		Date of testing, onset unknown	
	A, A'	B	A, A'	B
January .....	5	51	0	10
February .....	12	155	13	52
March .....	4	241	3	86
April .....	1	8	0	5
Total .....	22	455	20	153

ruary. The second table shows a total of 650 cases diagnosed by serologic tests (hemagglutination inhibition and complement fixation tests) with 608 tests positive for type B and 42 for A and A'.

### Summary

It would appear that while influenza type B has been locally prevalent throughout the United States during the winter months and in some instances has had a high attack rate, there was no significant mortality associated with the disease in 1952.

## Organization of the Program in the United States

### THE ADVISORY COMMITTEE

*For the Surgeon General  
Public Health Service*

Dr. Victor H. Haas  
Director, National Microbiological Institute  
National Institutes of Health

*For the Surgeon General  
Department of the Army*

Col. Tom F. Whayne (MC), USA  
Chief, Preventive Medicine Division

*For the Surgeon General  
United States Navy*

Capt. R. W. Babione (MC), USN  
Director, Preventive Medicine Division

*For the Surgeon General  
United States Air Force*

Col. Fratis L. Duff (MC), USAF  
Chief, Preventive Medicine Division

*Office of the Secretary of Defense*

Brig. Gen. James O. Gillespie (MC), USA  
Armed Forces Medical Policy Council

*Bureau of Animal Industry  
U. S. Department of Agriculture*

Dr. H. W. Schoening  
In charge, Pathological Division

### CENTERS

#### STRAIN STUDY CENTER

Dr. T. F. Magill  
Department of Microbiology and Immunology  
College of Medicine, State University of New York  
Brooklyn, N. Y.

#### INFLUENZA INFORMATION CENTER

Dr. Dorland J. Davis, Executive Secretary  
National Institutes of Health  
Public Health Service  
Bethesda, Md.

## DIRECTORS OF INFLUENZA STUDY LABORATORIES

### FIRST REGION

Dr. Maxwell Finland  
Boston City Hospital

#### *Collaborating Laboratories*

Dr. F. L. Mickle, Connecticut State  
Health Department, Hartford  
Dr. Johannes Ipsen, Massachusetts  
State Health Department, Boston

### SECOND REGION

Dr. Irving Gordon  
New York State Department of  
Health, Albany

#### *Collaborating Laboratories*

Drs. W. Henle and M. Sigel, Chil-  
dren's Hospital, Philadelphia  
Dr. S. S. Kalter, Syracuse Univer-  
sity, New York  
Dr. G. K. Hirst, New York City Pub-  
lic Health Research Institute  
Dr. J. E. Noble, District of Columbia  
Health Department  
Dr. C. A. Perry, Maryland State  
Health Department, Baltimore  
Dr. T. G. Ward, Johns Hopkins  
University, Baltimore

### THIRD REGION

Dr. Jonas E. Salk  
University of Pittsburgh  
School of Medicine

#### *Collaborating Laboratories*

Dr. John Dingle, Western Reserve  
University, Cleveland, Ohio  
Dr. L. F. Ey, Ohio State Health  
Department, Columbus  
Dr. K. E. Cox, West Virginia  
State Health Department, Charles-  
ton

### FOURTH REGION

Dr. Thomas Francis, Jr.  
University of Michigan  
School of Public Health, Ann Arbor

#### *Collaborating Laboratories*

Dr. C. G. Loosli, University of Chi-  
cago

Dr. Albert Milzer, Michael Reese  
Hospital, Chicago  
Navy Medical Research Unit No. 4,  
Great Lakes, Ill.

Dr. H. J. Shaughnessy, Illinois  
State Health Department, Spring-  
field

Dr. S. R. Damon, Indiana State  
Health Department, Indianapolis  
Dr. W. D. Stovall, Wisconsin State  
Health Department, Madison

Dr. H. M. Powell, Eli Lilly and  
Company, Indianapolis

Dr. R. L. Thompson, Indiana Uni-  
versity Medical Center, Indianap-  
olis

### FIFTH REGION

Dr. A. P. McKee  
University of Iowa, Iowa City

#### *Collaborating Laboratories*

Drs. H. Pinkerton and G. O. Broun,  
St. Louis University

Dr. Henry Bauer, Minnesota State  
Health Department, St. Paul

Dr. I. C. Adams, Missouri State  
Health Department, Jefferson City

Dr. L. O. Vose, Nebraska State  
Health Department, Lincoln

Dr. M. E. Koons, North Dakota State  
Health Department, Bismarck

Dr. B. E. Diamond, South Dakota  
State Health Department, Pierre

Dr. J. T. Ritter, Wyoming State  
Health Department, Cheyenne

Dr. Gordon Meikeljohn, University  
of Colorado, Denver

### SIXTH REGION

Dr. E. H. Lennette  
California State Health Department,  
Berkeley

#### *Collaborating Laboratories*

Dr. A. W. Frisch, University of Ore-  
gon, Portland

Dr. A. S. Lazarus, University of  
Washington, Seattle

Dr. F. P. Pauls, Alaska Territorial  
Department of Health, Juneau

Dr. Max Levine, Territory of Hawaii  
Department of Health, Honolulu

Dr. G. M. Uhl, Los Angeles City  
Health Department

Dr. William Levin, Oregon State  
Health Department, Portland

### SEVENTH REGION

Dr. Morris Schaeffer  
Public Health Service  
Communicable Disease Center  
Virus Laboratory, Montgomery, Ala.

#### *Collaborating Laboratories*

Dr. D. H. Sprunt, University of Ten-  
nessee, Knoxville

Dr. G. J. Buddingh, Louisiana State  
University, New Orleans

Dr. S. E. Sulkin, Southwestern Med-  
ical College, University of Texas,  
Dallas

Dr. Morris Pollard, University of  
Texas, Galveston

Dr. A. V. Hardy, Florida State  
Health Department, Jacksonville

Dr. Ben Boltges, Medical College of  
South Carolina, Charleston

Dr. G. H. Hauser, Louisiana State  
Health Department, New Orleans

Dr. J. H. Hamilton, North Carolina  
State Health Department, Raleigh

Dr. F. R. Hassler, Oklahoma State  
Health Department, Oklahoma  
City

Dr. H. F. Wilson, South Carolina  
State Health Department, Colum-  
bia

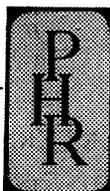
Dr. J. V. Irons, Texas State Health  
Department, Austin

Dr. Adah Corpening, Virginia State  
Health Department, Richmond

Dr. E. C. Curnen, University of  
North Carolina, Chapel Hill

### EIGHTH REGION

Dr. J. Enrique Perez  
School of Tropical Medicine  
Puerto Rico



# Ideas

## Tenant Nurses

**CUYAHOGA COUNTY, OHIO.** Building homes for their families and establishing nurseries for their children has been suggested here as one way to attract married nurses to a hospital in a rural area.

The addition of 260 beds this summer increased the facilities of Sunny Acres Tuberculosis Hospital at Warrensville to a total of 650 beds. The success of Cuyahoga County's tuberculosis program depends on getting enough nurses to staff the hospital.

The plan proposed for Sunny Acres calls for building individual homes to house the families of married nurses on farmland adjacent to the hospital, charging a reasonable rent, and amortizing the cost to the county over a 25-year period. Single nurses also may be attracted to the country life and the individual homes at Sunny Acres. It is estimated that the individual houses would be cheaper per square foot than a dormitory-type nurses' home.

The Cuyahoga County tuberculosis controller, Dr. Joseph B. Stocklen, has presented the idea to the trustees of the hospital and the county building commission who are investigating its possibilities.

## Film Saving

**LOS ANGELES COUNTY, CALIF.** The preservation of negative X-ray films taken in mass surveys is not a storage or reference service problem in the County of Los Angeles Health Department.

After reading, films are inserted in folded cards which are then metered and mailed either to the persons surveyed or to the physicians of referred patients. Past practice has proved the procedure to be economical and satisfactory.

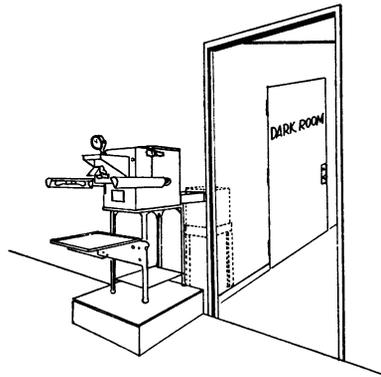
The cards are of postcard color and quality. For 4- x 5-inch films,

the size is 5½" x 8½" before folding. Standard postcard size, double-fold, is used for 70-millimeter films. At the time of exposure, the cards are stamped with the patient's control number and addressed. On the reverse side of the card, a printed statement informs the recipient that the film is negative and that he is responsible for its safekeeping.

As a further economy, the health department finds the 4- x 5-inch film of increasing usefulness in chest reviews where the large 14- x 17-inch film was formerly considered necessary.

## Nonstop Photocopying

**DES MOINES, IOWA.** Where a darkroom is available, a satisfactory arrangement for speeding the development process is provided by cutting a hole in the wall of the darkroom and running the conveyor belt of the photocopy machine through the hole so that exposed paper can drop into a box inside the darkroom. See the accompanying sketch.



This device permits continuous operation and rapid development. It is unnecessary to remove the transfer box at any time.

## Seminar For Supervisors

**NORTHERN VIRGINIA.** Health officers and other public administrators are equipping themselves for more effective supervision of personnel by attending an evening seminar for supervisors.

The seminar is sponsored by the cities of Alexandria and Falls

Church and the counties of Fairfax and Arlington. The four Virginia communities are a part of the metropolitan area surrounding Washington, D. C.

The University of Virginia gives six credits to participants. The seminar meets once a week for 3 hours and is supervised by Dr. Roland Eggers, director of the university's department of public administration.

Health officers, city managers, county executive officers, police superintendents, welfare directors, recreation directors, and directors of public works have already attended the course.

Discussion topics in the weekly sessions have included—

The supervisor's responsibility for getting the work done.

Orienting a new employee.

Practicing and reviewing methods of instruction.

Conferences and meetings as instructional devices.

The installation of new methods.

## One Tape: One State

**NEVADA.** The health department has full radio coverage of the State with a single tape recording of its weekly 15-minute health talk.

Several years ago, a Reno radio station agreed to broadcast a 5-minute weekly dialogue prepared by the State department of health. The radio studio provided the narrator. A few months later, it invited the health department to lengthen the script to 15 minutes and readily agreed to make an extra tape recording of each program.

Las Vegas, Elko, and Ely stations joined the broadcast series. The one additional tape is all that is needed, because the four stations are remote from each other, and simultaneous broadcasting is unnecessary. Thus, the health department's message reaches the north, east, south, and west areas of Nevada.

The radio stations speak well of the quality of the programs, which are strictly a home product. Limited personnel and budget need not stymie public health information.